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REVIEW OF RESEARCH IN VOCATIONAL TECHNICAL TEACHER EDUCATION.

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THE PURPOSES OF THE STUDY WERE TO (1) REVIEW, ORGANIZE, AND INTERPRET THE RESEARCH SINCE 1962 IN ORDER TO OPEN NEW VISTAS FOR FURTHER INVESTIGATIONS, (2) DEVELOP A MODEL TO PROVIDE A MEANS FOR CLASSIFYING COMPLETED STUDIES, SHOWING INTERRELATIONSHIPS AMONG THEM, UNCOVERING GAPS IN OUR KNOWLEDGE, AND PLANNING FURTHER INTEGRATED PROGRAMS OF RESEARCH, AND (3) SUGGEST SOME MAJOR QUESTIONS FOR RESEARCH. A MODEL FOR CLASSIFYING STUDIES IS DIAGRAMMED AND DISCUSSED, AND COMPLETED STUDIES ARE SYNTHESIZED UNDER ITS MAJOR DIVISIONS--(1) JOB REQUIREMENTS, (2) INPUT (SOURCES OF TEACHERS), (3) PROGRAM DEVELOPMENT, (4) GUIDANCE AND SELECTION, (5) RECRUITMENT, AND (6) PROGRAM EVALUATION. A BIBLIOGRAPHY OF 141 ITEMS PUBLISHED FROM 1962-67, LISTS THE STUDIES DISCUSSED. SOME OF THE MAJOR QUESTIONS SUGGESTED FOR RESEARCH ARE (1) WHAT IS THE CURRENT ROLE OF THE VOCATIONAL-TECHNICAL TEACHER, (2) WHAT COMPETENCIES ARE AND WILL BE REQUIRED TO ADEQUATELY PERFORM IN THE DESIRED MANNER, (3) HOW MANY TEACHERS WILL NEED TO BE TRAINED IN THE FORTHCOMING YEARS, (4) WHAT GROUPS REPRESENT POTENTIAL SOURCES FOR PRE AND INSERVICE TEACHER EDUCATION PROGRAMS, (5) WHAT EDUCATIONAL EXPERIENCES PROVIDE THE MOST EFFICIENT BRIDGE BETWEEN THE EXISTING COMPETENCIES OF VARIOUS SOURCE GROUPS AND REQUIRED COMPETENCIES OF HIGHLY QUALIFIED TEACHERS, (6) HOW DO WE ASSESS THE INDIVIDUAL COMPETENCIES, (7) WHAT INCENTIVES ARE MOST INFLUENTIAL IN ATTRACTING DESIRABLE CANDIDATES, AND (8) HOW WELL HAS THE TEACHER EDUCATION PROGRAM FUNCTIONED. (MM)

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INTRODUCTION

Every major division of education should periodically assess and synthesize the knowledge that has been accumulated through relevant research and development activities so as to make that knowledge more accessible and useful to practitioners and researchers. Such a review in vocational-technical teacher education seems long overdue. It is difficult, however, to satisfy the needs of both practitioners and researchers in a single review. Practitioners are primarily concerned about the application of new knowledge to operational situations. On the other hand, some researchers desire a comprehensive, annotated list of projects that will facilitate their own reviews of the literature, while other researchers want an organization and interpretation of completed projects that will open new vistas for further investigations. This review is directed principally to the latter group. Three steps were therefore taken.

First, although it cannot be claimed comprehensive, a review of research was conducted. Since the 1962 issue of the Review of Educational Research on "Vocational, Technical, and Practical Arts Education" listed about ten studies in vocational-technical teacher education, 1962 seemed a good date at which to start the review with a fairly clean slate. It soon became obvious, however, that restricting the review to materials dealing directly with teachers of vocational-technical programs would not result in a representative report of available relevant knowledge. Consequently, the review encompasses some materials from the general field of teacher education. With respect to the limitations of the review, research, developmental, and pilot training projects were considered appropriate to report, but articles, speeches, and conference discussions which were not obviously based on some systematic, formal attempt to add to our knowledge in the field were generally excluded. Thus, the review is broader, in some respects, than vocational-technical teacher education per se, but it should not be presumed to be exhaustive. An ideal review cannot deal solely with studies in teacher education. Almost all research concerned with the educational experiences of students has implications for teacher behavior, and therefore is potentially relevant to the development of teacher education programs.

Second, a classification model was developed which provides an exhaustive series of relatively mutually exclusive categories in the realm of vocational-technical teacher education. The model provides a means for classifying studies that have been done, for showing the interrelationships among them, for uncovering gaps in our knowledge, and thus for planning further integrated programs of research.

Third, following the review of literature and the organization of selected studies according to the classification system, an attempt was made to suggest some of the major questions for which research is needed in each of the categories of the model.

A CLASSIFICATION MODEL

Figure 1 depicts the model utilized for classifying research in vocational-technical teacher education. The "Job Requirements" category contains studies which set the goals of the teacher education effort. The first subcategory, "roles", presents attempts to provide current and predicted descriptions of the teacher's responsibilities and behaviors from psychological, sociological and educational perspectives. Role then determines the kind and amount of "competencies" required by teachers, shown as the second subcategory of studies. The nature of his role or roles, along with many other factors, also influences the third subcategory of investigations dealing with the current and predicted "numbers" of teachers needed.

The "Input" category answers questions about the amount and nature of the human resources available to teacher education programs. The su category of "sources" pertains to the relative potential of various groups for providing appropriate numbers and kinds of prospective teachers, while "existing competencies" is concerned with studies which estimate the expected relevant capabilities of those source groups.

The differences between sets of competencies to be required by highly qualified teachers and those typically possessed by the several source or input groups dictate the various kinds of teacher education "Programs" that might be developed to effectively utilize available human resources. The familiar subcategories of "pre-service" and "in-service" programs are convenient to describe the stage in which programs are to be provided for input groups. Making a distinction between "degree" and "non-degree" programs may have some practical value. Further, since each teacher education program must be concerned with content, method, organization and administration, and because specialized studies have been and should continue to be conducted in these areas, separate subcategories are provided for them.

"Guidance and Selection" studies, the fourth major category, logically follows the identification of prerequisite student characteristics assumed by programs, and those attributes implied by and deemed important to success and satisfaction in programs after admission and following graduation.

"Recruitment" focuses on attempts to identify cogent incentives for each potential source of teachers, and to develop efficient means for communicating with prospects at propitious times.

The last category, "Evaluation", includes attempts to estimate the effectiveness of the educational experiences provided by the program. "Intrinsic" refers to studies which evaluate process; the criteria used are the programmatic variables themselves, such as facilities and content. "Pay-off" evaluation, on the other hand, investigates the effects or products of the program, using operationally defined criteria. Within each of these subcategories, the primary purpose of the evaluation may be "formative", to assist in developing and improving the program, or it may be "summative", to make a final estimate of program effectiveness.[1]

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[1] A further explanation of the concepts "intrinsic, pay-off, formative, and summative" evaluation can be found in the chapter by Michael Scriven, "The Methodology of Evaluation", Perspectives of Curriculum Evaluation, AERA Monograph Series on Curriculum Evaluation, No. 1, 1967.

Fig. 1

A MODEL FOR CLASSIFYING R & D IN VOCATIONAL-TECHNICAL TEACHER EDUCATION

	JOB REQUIREMENTS			INPUT		PROGRAM												GUIDANCE & SELECTION	RECRUITMENT	EVALUATION			
						Pre-Service						In-Service								Intrinsic		Pay-off	
						Degree			Non-degree			Degree			Non-degree								
	Roles	Competencies	Numbers	Sources	Existing Competencies	Content	Method	Org. & Admin.	Content	Method	Org. & Admin.	Content	Method	Org. & Admin.	Content	Method	Org. & Admin.			Formative	Summative	Formative	Summative
Research																							
Development																							
Pilot-Demonstration																							
Dissemination																							

There is an obvious interdependence among the categories of the classification model which implies a logical sequence for studying problem areas, beginning with "Job Requirements" and proceeding to "Input", to "Programs", etc. This does not mean that many studies cannot be undertaken simultaneously across the entire range of problem areas, but it does indicate that the effectiveness of the system of vocational-technical teacher education is dependent upon recognizing the functional relationships that exist among its component parts.

While the columns in Figure 1 classify studies by problem area, the rows utilize standard categories to classify projects by their principal type of activity. "Research" projects attempt to discover new knowledge, develop or test theories. "Developmental" projects ordinarily endeavor to engineer the results of research into forms that can be used in classrooms and laboratories; that is, they produce materials or techniques that are applicable in practical situations. "Pilot or demonstration" projects try out new educational materials, and "Dissemination" projects communicate innovations and other educational ideas to the profession. Although a single project can encompass more than one kind of activity, there is a sequence inherent in the row categories which should prove helpful to those persons planning a series of projects in a specific problem area. In this review, no attempt was made to utilize the row categories of the model in organizing the projects reported.

STUDIES OF JOB REQUIREMENTS

What is the vocational-technical teacher's current role? In light of evolving social, economic, and educational conditions and burgeoning technological opportunities, what should his or her responsibilities and behaviors be in the future? What competencies are and will be required to adequately perform in the desired manner? How many teachers will need to be trained in the forthcoming years? Questions such as these have stimulated the studies reported in this section.

Several studies have investigated the current roles of agricultural and industrial education teachers. Two of these studies used role priority questionnaires for the purpose of making comparisons among (a) beginning agricultural teachers' role expectations, (b) their actual duties, and (c) experienced agricultural teachers' role perceptions for beginning teachers. One investigator (Todd, 1965) reported that a small sample of beginning and experienced instructors held fairly similar expectations of the role of beginning agricultural teachers, and that the duties performed by beginning teachers differed only "somewhat" from their role expectations, but that this difference was not related to the professional problems of beginning teachers as judged by administrators. The second researcher (Bryant, 1963), also using a small sample, found some disagreement between the roles beginning and experienced agricultural teachers considered desirable, and a fair amount of disagreement between reported performance and the desired role of beginning teachers. In this case, the investigator postulated that many adjustment problems of beginning teachers could be attributed to their attempt to mold the job to their desired image. A third study

(Drake, 1962) also reported a multiplicity of perceptions concerning the vocational agriculture teacher's role. An instrument containing 102 activities which defined professional role was administered to agricultural teachers, and to school superintendents, teacher trainers, and state supervisors of agricultural education. A lack of consensus was found within and between groups regarding the relative importance of role activities.

The role studies in industrial education took a different perspective. A questionnaire survey of Ohio trade and industrial teachers (Nichols, 1964) was conducted to define the tasks which comprised their job assignment. On the basis of the data received, twenty-five study guides were recommended to help provide the knowledge necessary to perform current duties. An investigation of Michigan industrial educators' self-perceptions (Nelson, 1962a) revealed that they typically did not view teaching as their central life interest. Rather, their occupational involvement consisted primarily of carrying out prescribed activities, with degree of involvement negatively correlated with amount of education and positively correlated with professional association activity. Instructors in large schools preferred their work role to be thought of as "teaching-in-general", while those employed in small schools chose a "specialist" work role orientation. Neither years of teaching, amount of work experience, type of teaching assignment, nor labor organization affiliation were related to either degree of occupational involvement or work role preference.

Although far too little effort has been expended to study the current role of the teacher, an equally important and neglected task has been to forecast his proper functions and behaviors in the years ahead. Some material basic to this prediction is available. A symposium was held (Bemis and McLure, 1966) to discuss the relationships between occupational education, manpower, and economic change. A review of research has been done on the social-cultural background of teaching (Charters, 1963). Two seminars have been conducted on the probable impact of television on education over the next decade (Hull, 1963). The uses of programmed instruction have been reviewed (The Center for Programmed Instruction, 1963). Studies have been conducted on the application of computer scheduling to vocational programs (Allen, 1966). But many more investigations are required before teacher role(s) can be realistically anticipated. Among these, the implications of the evolving philosophy of vocational-technical education, developing theories of instruction, the changing occupational structure, and the potential impact of other new instructional modes and media (team teaching, computer assisted instruction, etc.) must be considered. The outcome of the necessary philosophical research may be a series of job descriptions, each based upon different assumptions or perceptions of anticipated social, economic and educational conditions, perhaps further subdivided according to the educational level and student characteristics with which specific kinds of vocational-technical teachers will be expected to deal. It might be quite possible, for example, to conclude from such studies that at least some teachers in the future will become less concerned about developing instructional materials and dispensing information, and become more involved in diagnosing and prescribing for learning problems and in organizing and coordinating systems of instruction for individual students.

Two examples have been located in which the investigators attempted to recommend or develop vocational-technical teacher education programs based

upon assessment of changing social, economic and educational conditions. In the first (Schaefer and O'Brian, 1966), a symposium composed of representatives from various disciplines was held to explore the desired nature of vocational leadership in the forthcoming years and to estimate the contribution that each discipline might make. As a result, a doctoral program was developed. In the second instance, the investigator reviewed certain emerging theories of teaching and principles of vocational education to deduce general requirements for future trade and industrial teachers (Barlow, 1966).

In order to be maximally useful for teacher education program development, each current or predicted description of teacher duties and responsibilities should be transformed into required competencies -- the more detailed the better. Several studies were reported which attempted to identify competencies currently needed by teachers. While job descriptions were not specified in advance by the investigators in any of these studies, (respondents were therefore guided by their own perceptions of role), all the investigators did presume that some kinds and amounts of (a) pedagogical abilities, (b) general abilities, (c) personal characteristics, and (d) subject matter knowledge and skills are presently required by vocational-technical teachers. Some of the studies were concerned with identifying several of these kinds of competencies, while other studies focused their attention on one of them.

The professional abilities most frequently attributed to successful home economics teachers by state and city supervisors in New York and Indiana included being able to plan lessons properly, manage a class well, gain and maintain rapport with students, and work cooperatively within the school and community (Spencer, 1963). The same supervisors felt that planning and organizing work and communicating the contributions of home economics to others were the two areas in which teachers needed the greatest improvement.

At least four researchers in business and distributive education have used the critical incident technique to identify pedagogical and personal competencies required by teachers (Garman, 1965; Harris, 1965; Perry, 1964; Samson, 1964). Incidents which had an observable outcome on students were reported, through interview or questionnaire, by students, student teachers, cooperating teachers, supervising teachers, etc. The outcome of each incident was judged desirable or undesirable by the reporter and the teacher's behavior during the incident was accordingly labeled effective or ineffective. Teacher behaviors were also classified by the investigators into behavioral categories, e.g. student discipline and control, instructional activities, administration and operation of the program, etc. Critical requirements for teachers (competencies) were derived by inference from the effective teacher behaviors which were reported more than some arbitrarily chosen number of times. The kind of teacher behaviors found by the various studies were fairly consistent, but the judgments regarding their effectiveness (whether they resulted in desirable or undesirable student outcomes) often differed between and within studies depending upon the group making the judgment. This is not unexpected in view of the varying perceptions different groups apparently have of the teacher's proper role. The critical incident technique, therefore, seems to be a useful tool for identifying some teacher behaviors of a personal and pedagogical nature that have an immediate observable effect upon

students, provided a large enough sample of critical incidents is collected. However, unless teacher role is carefully delineated in advance, value judgments of the relative effectiveness of those behaviors are likely to lack reliability, and the competencies inferred from the behaviors will be of questionable usefulness.

Based primarily upon expert opinion, a committee (American Society for Engineering Education, 1962) recommended a very general set of desirable staff characteristics for engineering technician programs. In addition to intelligence, teaching competence, interest in students, and knowledge of their subjects, the committee felt the faculty should (a) be committed, individually and collectively, to the objectives of technical programs, (b) consist principally of full-time teachers with recent, relevant work experience, (c) contain at least 50 per cent graduate engineers, and (d) possess a variety of educational backgrounds. Another investigator employed a group of thirty local directors and fifteen teacher educators (Schaefer, 1963) to distinguish between usual and superior industrial education teachers on the basis of John Walsh's list of 107 competencies. The two groups of educators were in fair agreement that knowledge of subject matter was the critical variable.

There is no doubt that the subject matter competencies of vocational-technical teachers is important. The problem is to identify them, even those currently required, with sufficient validity and precision to distinguish between acceptable and unacceptable competence and to provide specific goals for use in curriculum development and for teacher selection. The first step might be to identify the criterion group with the desired subject matter competencies. Observation could then reveal the manipulative abilities they possess; we now have a taxonomy which should facilitate the classification of motor skills for educational purposes (Simpson, 1966). But technical knowledge is more difficult to assess. When the observer infers that knowledge from the overt activity of the criterion group, it is a highly subjective procedure; when the typical methods of employing advisory committees or securing a larger group's opinion are used, they yield only the grossest kinds of data, often reflecting group biases. For example, a check list of forty-nine abilities in rural electrification was developed (Shih, 1962) and then rated by educators and by rural servicemen and farmers. While some agreement in ratings of required abilities was apparent, it was also evident that educators tended to rate the importance of listed abilities considerably higher than non-educators. Recently, a somewhat different approach to identifying technical knowledge has been attempted (Schill and Arnold, 1965) in which employed technicians were asked to rate, by a modified Q-sort technique, the degree of relatedness of ninety-nine course descriptions to their jobs. This method, despite some limitations, appears to be an improvement over the more traditional techniques, and also permits a more objective estimate of the degree to which various groups of technicians employ the same kinds of information. Much more work, however, is needed on the methodology of specifying desirable terminal subject matter competencies.

While required competencies have implications for curriculum content, and consequently for the qualitative dimension of the teacher education task,

estimates of the numbers of teachers to be trained provide the quantitative dimension. Only three studies dealing with predicted demand were located.

The first (U.S. Office of Education, 1967) predicted the secondary and post-secondary student enrollment based upon assumptions of occupational demand, growth in educational facilities, and student interest, and then used a 1-45 teacher to student ratio to estimate vocational-technical teacher demand. The resulting forecast called for 213,300 teachers by 1970 and 350,000 by 1975. These figures may be compared with the 124,729 vocational-technical teachers actually employed in 1966.

The second study (Hensel, 1967) polled state directors for data on numbers of full-time, public school vocational-technical teachers employed in 1965 in reimbursable programs (excluding manpower training programs), and their estimates of the numbers to be needed in 1968. The results, presented by high school and post-high school employment for each of the several vocational-technical fields, indicated that 86,261 teachers were employed in 1965 and that 22,485 additional instructors (26 percent increase) would be needed by 1968.

The third investigation (American Vocational Association Staff, 1967) also polled state directors of vocational education for their predicted teacher requirements. In this case, it was reported that 121,870 public school teachers and 6,641 MDT instructors were employed in 1966, and that a total of 165,152 teachers would be needed to staff the programs anticipated for 1970 (an increase of about 36,600).

Some of the problems of prediction are evident in these three studies. It should be relatively simple to agree upon the definition of the group for whom predictions are to be made, and, hopefully, the prediction will provide sufficient lead time to permit remedial action in the interim. Estimates, however, are only as valid as the bases used to make them, and the bases used by respondents in a survey are not only unknown, but are probably inconsistent as well. The proper basis for prediction is not easily agreed upon. Student enrollment trends, planned expansion of facilities, student expressed demand, student availability, the number who "should" be in vocational programs, and occupational demand, each adjusted for factors such as those that influence student-teacher ratio, occupational structure, selective service laws, and changes in the social value of work, are some of the possible bases for forecasting change in the numbers of teachers needed. Each has its advantages and disadvantages. Further, to properly predict <u>training</u> needs, teacher replacement rates also have to be computed, and the occupational mobility of instructors has to be considered.

INPUT STUDIES

What groups represent potential sources for pre-service and in-service teacher education programs? How many candidates is each source likely to yield? What relevant competencies can we expect each group to possess before entering the programs? The answers to questions like these, when considered in light of the number and competency requirements of highly qualified

vocational-technical instructors, indicate the desirability of each group as a source, and dictate the scope and nature of the teacher education programs that must be provided.

One obvious question is, "Where do our teachers now come from?" The trade and industrial supervisors and technical education supervisors in thirty-five states responded to that question for the 1965-66 school year (Beaty, 1966). For both high school and post-high school trade and industrial positions the sources yielding the greatest number of teachers were, in rank order, (a) men employed full-time in industry, (b) teachers of non-vocational subjects, (c) graduates of college or university programs, (d) evening school instructors, (e) full-time industrial employees attending degree programs on a part-time basis, and (f) ex-military personnel. The rank ordered sources of teachers for technical education programs were (a) men employed full-time in industry, (b) graduates of college or university programs, and (c) part-time industrial employees attending degree programs on a part-time basis.

A report (U.S. Department of Health, Education and Welfare, 1965b) on degrees conferred in vocational-technical education, 1963-64, shows the following numbers. (It is reasonable to assume that only the number receiving Bachelor's degrees should be considered potential additions to the teaching field.)

Table 1.

BACHELOR'S AND HIGHER DEGREES CONFERRED, 1963-64

Field	Bachelor's (4 yr.)	Master's	Doctor's
Agricultural Education	964	307	20
Business and Commercial	6159	823	30
Distributive and Retail Selling	112	26	2
Home Economics Education	4343	404	11
Trade and Industrial Education	704	210	13
Total	12282	1770	76

Former vocational instructors are another source of teachers. A survey was made of 205 ex-teachers who graduated from degree programs in home economics, agriculture and business education, and who taught for at least one year before leaving the profession (Thompson, 1966). The peak leaving period was after two - four years of teaching. Encouragingly, 55 percent of the sample

held positive attitudes toward returning to teaching. Sex differences in attitude were not reported.

Increasing attention is being paid to retiring military personnel as a possible source of teachers. Approximately 7,000 men retire each year with a Bachelor's degree or higher at an age roughly equivalent to the average age of college faculties. Of this number, it is estimated that nearly 66 percent have a strong interest in entering teaching (Bates, 1963). Another researcher (Disque, 1967)reported that retired military personnel often have great potential for teaching: (a) They are used to dealing with heterogeneous groups, (b) they have varied work experiences, (c) they have frequently been exposed to continuing education, and (d) they may have had formal teaching experience. On the other hand, the investigator pointed out that there are also possible hazards involved: (a) Retired military personnel are used to a caste system, (b) they are not accustomed to direct public scrutiny, and (c) they may have come to rely upon obtaining conforming behavior automatically. At least two additional U.S.O.E. funded projects now in progress are further investigating the teaching potential of this group.

Presently employed teachers constitute the resource for in-service programs. A pilot study was conducted in California (Podesta, 1966) to develop the instruments for a regional or national survey of the educational and work backgrounds of vocational-technical instructors. Industrial arts teachers were also sampled in the pilot study, and it was found that many of them had sufficient work experience to be certified as vocational instructors.

Another investigator (Larson, 1965b) surveyed the industrial-technical teachers in Michigan's Community Colleges. One-half of the sample had at least a Master's degree, and of these, 66 percent had their degree in industrial education. The majority of undergraduate degrees, however, were not in education. In the total sample, the median number of semester hours taken in teacher education courses was six, the median number of semester hours taken in technical courses was eighteen, and the median number of years of closely related work experience was four.

While the studies reported above are useful, they do not provide adequate answers to the questions posed at the beginning of this section. The methodological problems in predicting teacher supply, in assessing existing competencies, and in estimating normative abilities for each source group remain unsolved; they seem prerequisite to obtaining satisfactory answers to our substantive questions. In the interim, the degree to which attention is focused upon specific source groups for new teachers will probably depend upon teacher educators' vocational education philosophy and their gross estimate of existing conditions. Attracting prospective teachers from business and industry "directly" into teaching might be the mode in some fields if the intent of the vocational-technical program is to provide terminal, highly specialized skills and if the urgency of teacher demand is perceived to be critical. Given a less urgent situation and a well developed network of post-high school vocational-technical programs, the focus might be on creating a teacher education superstructure in which the best vocational-technical graduates can be prepared to become instructors. And, as the philosophical emphasis shifts to providing less specialized public vocational

instruction, and greater time is believed to be available to prepare career instructors, teacher education will be correspondingly thought of more as a total college and university responsibility.

PROGRAM DEVELOPMENT

What educational experiences provide the most efficient bridge between the typical existing competencies of various source groups and the required competencies of highly qualified teachers? The research and development activity designed to answer this basic question has been relatively great, if not systematic. For convenience, the studies reported in this section have been organized into groups relating to (a) pre-service programs (by field), (b) student teaching and internship programs, (c) in-service programs, (d) educational media, and (e) organization and administration.

Forty-three heads of agricultural education departments indicated that they were reasonably well satisfied with the general requirements of their present pre-service degree programs (general education about 58 credits, technical agriculture about 56 credits, and professional education approximately 23 credits). They did opine, though, that more student teaching, a greater variety of technical courses, and more elective choices would be desirable (Jabro, 1962).

Home economics teacher educators, supervising teachers, and city and state supervisors (a sample of 176) were surveyed to determine the most important of seventy-six generalizations to be taught in teacher education programs (Brennan, 1963). The seven generalizations most agreed upon as very important included four concerned with program planning, and one each dealing with the role of the teacher, the relationship between subject matter and families, and evaluation.

Business teacher educators engaged in a four-year curriculum study to identify and evaluate the subject matter elements of their teacher education programs (NABTE Curriculum Study Committees, 1963-64 and 1964-65). An overall steering committee was used to guide seven sub-committees, each of which was charged with the responsibility for one of the following curriculum areas: (a) Curriculum planning, personnel services, and teaching methodology; (b) secretarial and related office machines; (c) student teaching and other laboratory school experiences; (d) business administration and economic education; (e) bookkeeping, accounting, and related office education; (f) distributive subjects; and (g) methods courses in business education. During the conduct of the project, workshops were held at two national conventions, about one hundred business educators were used to identify subject matter elements, and over two hundred business teachers were used to rate the elements. In a more recent study (Cook, 1966), a series of national and regional clinics were held to distill a set of nineteen guidelines for the pre-service education of office occupation teachers.

The extent to which colleges and universities will grant degree credit for prior or concurrent work experience can be an important factor in program development, as well as in the selection of prospective teachers. A questionnaire survey of ninety-one business teacher education programs revealed that

85 percent believed in the value of work experience, 29 percent had existing store work experience programs, and 30 percent had an office work experience program for which college credit was granted (Sheehan, 1964).

Trade and industrial teacher education programs have historically relied heavily upon work experience as a means for acquiring subject matter competencies. The results of a survey of 201 institutions with industrial teacher education departments is therefore of interest (Lauda, 1966). Forty-nine institutions, primarily large ones, did grant credit for existing trade competence, and thirty-nine additional schools were planning to do so. While there were great variations in the procedures of individual schools for awarding credit and evaluating competence, the average maximum credits that could be granted was twenty, and the usual requirements were (a) full-time enrollment in the institution, (b) a "sufficient" amount of trade experience, and (c) passing specially designed examinations. Some institutions are adopting "cooperative" programs. One such program (Ramp, 1962) accepts qualified graduates of appropriate two-year post-high school vocational-technical programs, and provides twenty-four months of full-time employment, professional education courses, general education courses, and student teaching in three additional years, culminating in a Bachelor's degree.

Vocational-industrial teacher educators in California (Allen, 1964) have developed a two-year (two "core") basic program in which classroom presentations are integrated with opportunities to make applications of the content, and in which teams of instructors plan, organize and present content to various size groups. The first-year core includes instruction on lesson planning, teaching skills, programed instruction, tests and measurement, organization and administration, and counseling. The second-year core includes principles and practices of vocational education, curriculum development, history-philosophy-sociology, and leadership development. A suggested course guide (U.S. Department of Health, Education, and Welfare, 1965a) has also been developed for the initial preparation of occupationally qualified vocational-industrial teachers.

Written instructional materials pertinent to trade and industrial teacher education programs have been analyzed. In two studies, the texts and references used in courses on trade analysis, course construction, curriculum materials development (Hanson, 1966a), and instructional methods, instructional aids, test construction, and shop management and safety (Hankin, 1966) were reported by a sample of teacher trainers from a variety of states. The teacher trainers also made suggestions regarding needed revisions, etc., and the contents of the text and reference materials were classified according to John Walsh's 107 teacher competencies.

The appropriate use of physical facilities for industrial teacher education programs was studied by two investigators. One designed a building for maximum flexibility and utilization in which to conduct all types of programs (Larson, 1966). The other tested the feasibility of using an "open laboratory" technique by comparing it with the conventional, scheduled usage of the laboratory space. The experiment showed there was no significant difference in the amount students learned in the two situations, but the "open laboratory",

in which students may use the facility whenever they want to complete assigned problems and projects, required 60 percent less time of the senior instructor, and incurred less total instructional cost (Erickson, 1962).

Student teaching and internship programs have been investigated by researchers in most vocational fields. One study (Cappiello, 1964) revealed the opinions of beginning teachers and supervising teachers concerning satisfactory and unsatisfactory elements of the student teaching experience. Among the desirable elements were: (a) Teaching for a full semester in the senior year, divided into two different school situations; (b) teaching in the area of greatest subject matter competence; (c) compatability of personality between the student teacher and his immediate supervisor(s); and (d) college personnel visiting student teachers, by appointment, about every three weeks. At least one of these findings was supported by a survey of home economics student teachers from five universities (Chamberlain, 1963). They reported that the shorter the length of student teaching, the less their satisfaction, and the greater the number of activities in which they engaged, the greater their satisfaction. The results of another questionnaire survey, directed to student teachers (Littrell, 1965), indicated that they expected to be exploited to some degree, but that it was asking too much for them to act as substitute teachers while the regular instructors take an extended rest!

Twenty-four statements, susceptible to differences of opinion among business educators, were selected and administered in rating scale form to ninety-nine student teachers, twenty-five of their college methods teachers, and ninety-four of their supervising teachers (Cooper, 1962). One-third of the sample of methods and supervising teachers were essentially in disagreement about the statements. The student teachers were in greater agreement with their supervising teachers than with their methods teachers, but since the student teachers were unaware that any differences in opinion existed, they were certainly not troubled by them. The great influence supervising teachers have on student teachers was borne out by a second study (Poleszak, 1964). Over one hundred industrial education graduates reported that the most important individual in their student teaching experience was the supervising teacher, followed, in rank order, by the college supervisor, other teachers, and the school principal.

Agricultural teacher educators' ratings were used to form groups of most and least effective supervising teachers (Rogers, 1965). The following teacher characteristics were found to be positively related to supervision effectiveness: (a) Age, (b) employment mobility, (c) years of experience as a supervising teacher, (d) number of academic degrees held, (e) amount of professional reading, (f) amount of participation in professional organizations, and (g) amount of participation in local community organizations. On the other hand, years of teaching vocational agriculture, special training in college, and kind and amount of professional training did not distinguish between the most and least effective supervising teacher groups.

Using motion pictures and printed materials, one researcher (Kersh, 1965) built a laboratory and developed techniques for simulating a variety of classroom situations in which the supervisor could control classroom student reaction to student teacher behavior.

A three-day conference was held (Gleason and Davis, 1967) to identify factors which characterize successful internship programs preparing persons for transition from business and industry to teaching. The conference report includes such topics as (a) defining internship, (b) selecting candidates, (c) clinical setting, (d) responsibilities of the university, (e) certification, and (f) measurement and evaluation.

The report of the Panel of Consultants on Vocational Education (U.S. Department of Health, Education and Welfare, 1963) described the existing organizational and administrative patterns in the U. S. for providing vocational teacher education, and, in so doing, roughly outlined some of the parameters of the in-service education task we now face. Since then, there has been some research and a considerable amount of developmental activity in this area.

A study of Kansas vocational agriculture teachers (Hall, 1962) showed that the respondents to a questionnaire rated off-campus university courses as the most effective means of maintaining technical competence, and considered extension specialists and county agents "good to excellent" technical resources; they also reported spending an average of nearly four hours per week in professional reading. Of course, the 29 percent of non-respondents may not have been nearly so enthusiastic or active. The relative effectiveness of three ways of scheduling an in-service technical course for vocational agriculture teachers was studied (Weller, 1963). No significant differences in learning were found between scheduling six, $2\frac{1}{2}$ hour classes (a) in one week, (b) at weekly intervals, or (c) at monthly intervals.

About 60 percent of the total vocational-technical staff in Connecticut engaged in some activity during one recent year to enhance their professional competence (Connecticut Department of Education, 1963), and a reasonably high proportion of Pennsylvania's trade and technical teachers expressed a desire to engage in more pedagogical and technical in-service activities (Brantner, 1964).

Fifty-one industrial educators, counselors, and representatives of business, labor, and industry in Michigan were interviewed to obtain suggestions for facilitating the in-service technical upgrading of industrial education teachers (Silvius, 1965). They indicated a need for more flexibility in the certification code; they suggested that industry sponsored courses, field trips, technical courses at the university, attendance at conventions, etc., working in industry, reading journals, and experimenting in the school shop were all legitimate means for maintaining or enhancing subject matter competence; and they recommended that schools pay beginning teachers according to their industrial experience, that schools conduct appropriate conferences, workshops, etc., that schools provide teachers with released time for attending legitimate educational meetings, classes, etc., and that schools recognize increased technical competence with salary increments.

Nine reports were found of completed developmental and training projects for various kinds of in-service teacher education programs: (a) An eight week summer institute to train instructors of instrumentation technology (Ziol, 1966); (b) a conference on new media of instruction (Payne, 1965;

Payne and Sherard, 1966); (c) an institute for instructors of dental assistants (Barton, et. al. 1966); (d) an institute for teachers of agriculture (Agricultural and Technical College at Cobleskill, New York 1966); (e) the formation of a teacher training curriculum for instructors of occupational level programs (O'Brian and O'Neil, 1966); (f) a workshop to prepare instructional materials for food service occupations (Hollandsworth and Barbour, 1966); (g) summer and year-long institutes for industrial educators using Oak Ridge facilities (Reed, 1966); (h) a six week pilot training project based on directed occupational experiences for distributive education teachers (Meyer, 1967); and (i) a summer pilot program for teachers involved with instrumentation of a technical nature (Larson, 1965a). In addition, at least six other similar projects have recently been reported in progress.

Five studies dealt with the use of educational media in teacher education programs. After developing guidelines and techniques for using large-screen TV in college-level courses, one researcher reported no differences in measured amount of learning between students treated by TV and face-to-face methods of presentation, nor between those treated by conventional and large-screen TV methods (Rich, 1966). A TV presentation, entitled "Introduction to Industrial Education", was produced and then shown in twenty-four, one hour segments to beginning teachers in North Carolina (Hanson, 1966b). Approximately half the teachers felt that the series was as effective as a regular class. In Minnesota (Wick, 1967), twelve, half hour TV segments were produced, together with teacher's guides and instructional materials designed to be used in an hour and a half discussion session following each TV (or video taped) presentation. Minnesota's total package of twenty-four hours was intended for pre-service use. Unit tests and a final examination were also developed. In a trial of the package, attendance (voluntary) was excellent, subjective student reaction was good, and test results showed satisfactory learning had taken place.

A motion picture and accompanying brochure were developed, based upon the results of a nationwide survey of experts, on the use of 8 mm. film (Forsdale, 1966). The purpose of the film and brochure was to illustrate the wide range of innovative educational applications of 8 mm. film. Lastly, a check list has been constructed, pilot tested, and field tested on a national sample, to evaluate the adequacy of media programs used in higher education institutions (Fulton, 1966).

Finally, a study pertinent to the financing of teacher education programs (Wenrich, 1962) indicated that teacher trainers in Michigan advocated receiving no reimbursement for on-campus courses, provided that 25 percent of the available state funds for teacher education be spent for research and experimental activities.

No doubt additional research, developmental, and training projects belonging in this section are now underway. For example, micro-teaching, computer assisted instruction, and the internship experience are being investigated by several people, and a number of summer institute programs are being conducted. With some caution regarding student age, ability, and nature of content, studies on teaching methodology in other subject areas are probably relevant. Thus, the major gaps in this category of studies appear to lie in

the areas of content selection and organization, and in program organization and administration. With respect to the former, we need means for selecting enabling or facilitating content that will permit the efficient attainment of desired terminal competencies. We must explore ways of structuring or organizing the selected content so as to yield maximally functional cognitive and motor skills. We should investigate the extent to which various amounts and kinds of occupational experience contribute to the attainment of different kinds of desired competencies. And, like other vocational-technical programs, teacher education needs to determine the degree to which various courses and curriculums can be grouped to eliminate unnecessary duplication of effort and to enhance performance flexibility. In the area of program organization and administration, the respective teacher education functions which should be performed by colleges and universities, state departments of education, private industry, local schools, etc. need investigation. What inter- and intra- institutional administrative arrangements can be devised, what shared facilities and staffing agreements can be established, and what regional or national cooperative efforts should be undertaken?

GUIDANCE AND SELECTION STUDIES

How do we assess the individual competencies (including characteristics) (a) assumed prerequisite by teacher education programs, (b) shown required for successful performance after entry into the programs, and (c) demonstrated to be influential in subsequent success and satisfaction as a teacher? The interrelationships between this category of studies and the categories of input, program, and job requirements are obvious, but the problems of instrumentation for identification are enormous.

Since judgments of teacher effectiveness vary as perceptions of desirable role and behaviors vary, three investigators tried to identify teacher characteristics that were associated with different patterns of teacher behavior without attempting to make judgments about the effectiveness of those behaviors. In a six year program of research involving over 6000 elementary and secondary teachers (Ryans, 1960), it was found that classroom instructors who behaved in a warm and friendly, responsible and businesslike, and stimulating manner tended to be (a) generous in their appraisals of others, (b) interested in reading, music, painting and the arts in general, (c) sociable with peers, (d) non-directive in the classroom, (e) high in verbal intelligence, and (f) high in emotional stability. On the other hand, teachers who behaved in an aloof and egocentric, unplanned and slipshod, and dull and routine manner in the classroom tended to be (a) critical of others, (b) older, (c) less sociable, (d) lower in verbal intelligence, and (e) less emotionally adjusted. The second investigator (Bowman, 1966) found significant differences on the Minnesota Teacher Attitude Inventory showing academic teachers to be more "democratic" than vocational teachers. The academic teachers were predominantly women, with less teaching experience and fewer credits in teaching methods than the vocational instructors; there was no difference between the two groups in IQ. The third study (Halchin, 1965) reported that teachers rated as high empathizers by twelfth grade students came from families with close, warm relationships, while those teachers rated as low empathizers came from homes which lacked close relationships and had more quarrels.

A number of researchers attempted to identify variables associated with teaching "success" in particular situations. Two researchers defined "success" in terms of academic achievement in the training program, while nine others employed teaching effectiveness as the criterion measure.

Using a weighted average grade in three courses taken during student teaching as the dependent variable, one investigator (Jarmin, 1963) found no useful relationships between it and the independent variables of prior achievement in high school, prior achievement in college, and standard college entrance examination scores. However, a study conducted in the Air Force (Mullins, 1962) showed that the General Aptitude Index, taken by all airmen, was highly correlated with their Instructor Aptitude Test, which in turn, satisfactorily predicted grades in technical instructor schools (correlations up to .63).

Teacher educators and cooperating teachers provided ratings of the teaching success of about one hundred fifty agricultural education student teachers; in addition, descriptions of actual student teacher behaviors were gathered (Fuller, 1963). The researcher devised and administered an instrument to the student teachers to measure three factors in each of the areas of student background, interest, personality, and attitude. The multiple linear correlation coefficient between factor scores and rated student teaching success was only about .23. Students who were judged very effective teachers were described as fair, kindly, alert, attractive, responsible, steady and poised; below average student teachers were depicted as evasive, dull, stereotyped, uncertain, disorganized, inflexible, and narrow. A second investigator (Lasap, 1964) also found no useful relationships between principal's ratings of experienced agricultural education teachers and their pre-college background in (a) farming, (b) supervised farming programs, (c) farm mechanics activities, or (d) FFA programs.

Three home economics teacher educators attempted to predict rated student teaching success, while a fourth researcher used pupil achievement, teacher-pupil rapport and adjustment to school and community as measures of teaching success. The first investigator (Monts, 1963) employed grade point average, the Guilford Zimmerman Temperament Survey (GZTS), the Minnesota Teacher Attitude Inventory (MTAI), and the Johnson Home Economics Interest Inventory (JHEII) to predict a composite rating by the supervising teacher and college supervisor of a small sample of home economics student teachers. The highest zero-order coefficient (.32) with teaching effectiveness resulted from the correlation with grade point average. The second researcher (Dotson, 1963) also found a significant correlation between grade point average and student teaching grades for 110 students. Scores on the Teacher Judgment Test (TJT) and the MTAI were not significantly correlated with the criterion. The results of the third investigation (Gritzmacher, 1963) lends further support to the conclusion that achievement in the program (grades) does have some positive relationship to success in student teaching. Scores on twenty-two scales of the Runner Studies of Attitude Patterns (RSAP) and JHEII measures failed to distinguish between two groups of ten student teachers, one high and the other low in proficiency, but a large proportion of total grades and separate course grades did differ significantly between the groups. The fourth study (Crabtree, 1965) utilized a panel of six judges to suggest weightings for deriving composite predictor scores from thirty-four separate

measures obtained from the GZTS, Minnesota Counseling Inventory (MCI), JHEII, JSI and cumulative quality point average. A composite teaching success score for the sixty-six home economics instructors in the sample was also derived from the panel's suggestions for combining (a) gain scores on tests of their ninth and tenth grade pupils' ability to solve problems, (b) two tests of teacher-pupil rapport, and (c) adjustment to school and community as rated by the school administrator. The best predictors correlated .41 with composite "success"; the most useful predictors proved to be academic achievement, two scores from the GZTS, and two scores from the MCI.

Three studies in industrial education have also attempted to predict teacher effectiveness. One of them (Frinsko, 1962) found that undergraduate honor point ratio and scores on the Minnesota Teacher Attitude Inventory[2] were significantly correlated with rated student teaching performance. The Edwards Personal Preference Schedule (EPPS) (Vacek, 1962) succeeded in distinguishing between "most and least successful" industrial arts teachers, as well as between industrial arts freshmen and freshmen in five other curriculums, between industrial arts freshmen and seniors, and between industrial arts freshmen and teachers. The third investigation revealed no significant relationship between the competence of 168 industrial arts student teachers and their "dogmatism" as measured by the Rokeach Dogmatism Scale (Thomas, 1964).

The preceding studies show that researchers have been rather persistent in attempting to identify personal characteristics which are related to teaching effectiveness, but, with the possible exception of factors measured by the EPPS and the MTAI, their efforts have met with little success. Despite this, many teacher educators still feel that personality is extremely important, but that we have not yet learned to measure the key factors. One survey of home economics educators (Breaux, 1963) illustrates the point. All respondents believed personality to be important in teacher selection; 58 percent even felt it to be more important than academic achievement. In actual practice, however, by far the largest majority of respondents used only measures of academic achievement as the basis for admission to their teacher education programs.

The studies reported in this section were selected because they were primarily concerned with identifying factors important in the selection of potential teachers. Many of the studies, however, included academic achievement in the program as one of the independent variables, and therefore could also appropriately be reported in the section on program evaluation. Rather than repeat them, it will be noted here that the best predictor of teaching effectiveness reported thus far is academic achievement in the teacher education program. Although it would be satisfying to believe that the amount learned from teacher education programs directly and positively affects teaching success, two factors should keep us from being overly optimistic. First, no causal relationship has been established between academic achievement and teaching effectiveness. It might be only that bright people happen to do well at both tasks. In any event, academic

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[2]A major discussion of the MTAI as a predictor of teaching behavior can be found in the chapter by Getzels and Jackson, "The Teacher's Personality and Characteristics" in Handbook of Research on Teaching, 1963.

aptitude appears to be a valuable selection factor. Second, measures of teaching effectiveness are highly subjective, probably unreliable, and are related to actual pupil learning only by hypothesis. Consider one experiment (Carpenter and Hadden, 1966) in which objectively measured student learning was the criterion. Disliked teachers tended to secure greater student achievement than liked teachers. Perhaps truly effective teacher behaviors are not always those which we might "logically" expect.

In addition to the criterion of teaching "success", a considerable number of researchers in vocational-technical teacher education have attempted to predict "satisfaction" in the program or on-the-job. The importance of determining appropriate independent variables becomes evident when the number of students voluntarily dropping-out of programs and the number of certified teachers who never enter or who leave the profession prematurely are considered.

Several studies have shown that only 54 to 78 percent of qualified agricultural education graduates ever teach in the secondary schools (Hoerner, 1965; Myers, 1964; Rhody, 1964; Shoup, 1965). The principal reasons given by those leaving the profession relate to advancement in salary or position. Other factors influencing the decision not to enter or to leave teaching were reported as (a) the decreasing school emphasis on vocational agriculture, (b) failure to adjust to problems with students or the administration, (c) long hours, and (d) community expectations for teachers (Hoerner, 1965; Rhody, 1964; Shoup, 1965). Questionnaire returns from 132 agricultural education teachers who graduated from one institution showed that those with a high school vocational agriculture background were more likely to teach than those without that background (Cook, 1962).

Eighty-eight distributive education teacher-coordinators completed the 16 Personality Factors Questionnaire and the Minnesota Satisfaction Questionnaire. A cross-validation revealed no significant multiple linear correlations between the 16 PF factors and job satisfaction factors (Olson, 1967).

The Just Suppose Inventory (JSI) was developed to measure the degree to which persons accept families of different types (Lehman, 1962). The Inventory was found (Chadderdon, et. al., 1966) to distinguish between home economics seniors and teachers and home economics students from different universities. The scores were also found to be related to parental education, father's occupation, and to the number and kinds of experiences respondents had with different types of groups.

Scores from the Guilford Zimmerman Temperament Survey (GZTS), the Just Suppose Inventory (JSI), the Minnesota Counseling Inventory (MCI), the Johnson Home Economics Interest Inventory (JHEII), and quality point average at the end of the second year of college were used to test for differences between groups of home economics students who (a) graduated and taught, (b) graduated but did not teach, (c) transferred out of the teacher education program, and (d) dropped-out of the university (Gaskill, 1965). As expected, the students who graduated from the program (groups a and b) had a higher quality point average than those who did not graduate (groups c and d). A JSI attitude score also differed significantly between the same two pairs of groups.

One scale (personal relations) of the GZTS, and two scales (defensiveness and adjustment) of the MCI distinguished between groups c and d. In another study, home economics education students were administered the Johnson Home Economics Interest Inventory as freshmen, then as seniors, and later as first-year teachers (Chadderdon, 1962). Almost 40 percent of the seniors reported a long-time high interest in teaching; this may account for the very small increase found in average interest scores between the freshman year and later administrations, and the low correlation coefficients reported between freshman interest scores and later scores. The interest scores of seniors were significantly related to their expressed choice of either entering teaching or entering some other home economics related occupation, but the large majority of seniors who actually entered teaching gave practical reasons rather than interest for their decision. Thus, as might be expected, interest alone does not dictate action in most cases.

Various measures of job satisfaction have also been used as the dependent variable in studies dealing with industrial education students and teachers. The Minnesota Vocational Interest Inventory (MVII) successfully discriminated between the expressed satisfaction and dissatisfaction of experienced industrial education teachers, and between satisfied and dissatisfied freshmen in industrial arts teacher education programs (Nelson, 1962b). Another study (Messman, 1963) showed that both the MVII and the Edwards Personal Preference Schedule (EPPS) differentiated between industrial arts freshmen and a norm group; it is therefore likely that the "need" variables measured by the EPPS are related to the vocational interest variables measured by the MVII. In a third study (Nelson, 1964) the EPPS was found able to distinguish between groups of (a) college men, (b) industrial arts students from four teacher education institutions, and (c) industrial arts teachers. Encouragingly, there was a consistency in the way that the industrial arts student and teacher groups differed from the normative group of college men.

The extent of and reasons for industrial education teacher turnover as indices of satisfaction were also studied. Among a sample of California teachers (Watkins, 1966), the turnover rate was 13.7 percent -- $2\frac{1}{2}$ times the rate for all teachers. However, 90 percent of those leaving industrial education positions remained in education. The principal reasons given for changing jobs were strong motivational factors for advancement, classes with hard-to-handle students, oversized classes, and lack of rapport with the administration. An analysis of the relationships between selected biographical, psychometric, and academic variables and persistence in teaching (MacLeod, 1965) indicated that industrial education persistors had a higher grade point average than non-persistors. Another provocative study (Schill, 1963) revealed that length of job experience and job level before entering teaching had no relationship to stability or vertical mobility in teaching. By contrast, there was a significant positive correlation between amount of schooling taken before and after entry into teaching.

Thus, the evidence gathered from studies concerned about teacher or student "satisfaction" appears to indicate a relationship between satisfaction and the individual's need-value-interest system(s). Further, some instruments, such as the EPPS, MVII, JHEII, and JSI give promise of measuring important components of the need-value-interest system(s). Prior experience in a given

occupational field no doubt helps crystallize the individual's affective pattern about that field and develops realistic perceptions of the occupational activities involved.

Only two studies were located which dealt with the problem of measuring the occupational subject matter competencies which individuals bring to teacher education programs. One attempt was reported to construct an Advanced Placement Qualifying Examination for a basic drafting course (Erickson and Hanke, n.d.). The test has a concurrent correlation of .70 with final course grades and a reliability of .96. A second investigator (Impellitteri, 1965) found no linear or curvilinear relationships between number of years of occupational experience and scores on written and performance tests, based upon over seven hundred persons who took trade competency examinations in fifty-nine occupations over a twenty-year period. No attempt was made, however, to check the validity of the competency tests.

The paradigm employed in this review implies that the competencies (including characteristics) a prospective teacher brings to the teacher education program, and the additions, revisions, etc. in those competencies caused by the program, result in his available pool of classroom/laboratory behaviors which, expressed (as his role) in interaction with students, serves to influence student behavior. Applying this model to guidance and selection studies, it is evident that little direct effort has been made to identify the specialized competencies prerequisite to entry into teacher education programs. This probably reflects the fact that most pre-service programs assume no prior pedagogical skills, and presume that all or none of the specialized vocational-technical subject matter skills are possessed (those in colleges do depend upon placement tests to identify competencies in <u>other</u> specialized areas). We tend to ignore potential prerequisite personal competencies because of lack of knowledge about them, and measure only academic aptitude as one kind of general competence. Our programs then attempt to provide the pedagogical skills we believe to be appropriate, and we may or may not provide experiences to develop specialized vocational and other general competencies in some direct fashion. As for personal characteristics, we tend to let nature take its course. Because of the organization of our typical programs, the use of average course grades as a criterion of success usually reflects the accumulation of specific knowledge and skills, not the ability to integrate these in the performance of the teaching role. Performance in student teaching, however, can provide a valid criterion of success, if a large enough sample of behavior is measured in realistic situations.[3] But at present, we crudely measure only teacher behaviors which we then <u>assume</u> to be more or less effective in influencing desirable student behavior. Our research tasks, therefore, appear to be (a) to extract the specific effects of various kinds of competencies upon teacher behavior patterns under differing stimulus conditions, (b) to measure the extent to which identified influential competencies can be altered by deliberate educational treatments, and thus determine the degree to which they must be prerequisite to program entry or can be formed during the program, and (c) to validate our assumptions of appropriate teacher behavior patterns under various educational circumstances in terms of actual student outcomes.

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[3]For a discussion of techniques see the Medley and Metzel chapter on "Measuring Classroom Behavior by Systematic Observation" in the <u>Handbook of Research on Teaching</u>, 1963.

RECRUITMENT

What incentives are most influential in attracting desirable candidates to vocational-technical teaching, to specific positions, to remain in the profession, and to seek in-service training opportunities? What is the most effective form and manner for communicating these incentives? How should the profession organize to undertake the recruitment task?

Business education teachers and undergraduates were asked which factors had the greatest influence in their decision to select business education as a major (Grinstead, 1963). The most important factors included (a) the multiple vocational opportunities, (b) satisfaction to be gained by serving youth, and (c) the practical aspects of the subject matter. Differences in rated teaching success, scholastic aptitude, and academic achievement were not related to the reported factors. Only one-third of the sample had decided to elect business education before entering college. Partial confirmation of these findings were reported in another survey of business education majors from four colleges (Thornton, 1964). The two most important reasons given for choosing the field were the dual career opportunity it afforded, and the satisfaction to be gained from working with young people. On the other hand, about three-quarters of the respondents became interested in teaching business subjects before entering college, principally because of having either early office experience or taking business subjects in school.

Interviews with nineteen vocational-industrial teachers (Parks, 1965) who were formerly tradesmen indicated that the major reason for their situs move to teaching was the failure of industry to satisfy their quest for self-realization, especially in the realm of social service. A few workers also thought that greater job security in teaching was sufficient incentive. The key factors important to college students in choosing a teaching career (Hills and Downs, 1962) are perception of income, and perception of advancement. A survey of 310 industrial education students (Ressler, 1966) found that they tended to have taken more industrial arts in high school than the national average, but that the majority of majors still entered college without teaching as a career goal. Some respondents in this study also reported that industrial arts teachers were influential in their eventual choice of careers; the specific industrial arts teachers who influenced sample members were found to be older, more experienced, and "better qualified" than the average industrial arts instructor.

It is apparent that the age at which individuals decide to enter vocational-technical teaching varies considerably. The decision seems to depend upon the nature of prior experiences, which shape the needs-value-interest system, the individual's perception of the teaching role, and other "practical" conditions operative at the time.

Over 62 percent of 153 industrial teacher education programs used one or more of the following practices to recruit high school students: (a) Sending faculty to special high school career days, (b) mailing brochures to industrial arts teachers, (c) participating in on-campus senior visiting days, and (d) mailing brochures to counselors (Spence, 1967). Another investigator (Jahrman, 1964) studied recruitment problems and concluded that sending teacher educators to the high school to conduct recruitment activities was probably the most effective practice.

Beginning teachers accept positions for several reasons. Apparently, the most important of these include assignment to teach a desired subject, a pleasant application-interview experience, and opportunity for professional growth. The least important reasons appear to be opportunity for supplemental income, and help gained from college and commercial placement offices (Johnson, 1965).

Semi-structured interviews with eighty-seven full-time junior college instructors revealed that those under a merit pay system spent more time maintaining their teaching competencies than teachers under the standard pay system based on academic preparation and teaching experience (Wallin, 1966). The finding has implications for in-service program recruitment.

An incentive for administrators to hold good teachers has been provided by a study conducted in and around New York City (Redefer, 1962). It costs between $500 - $1000 to recruit a teacher.

PROGRAM EVALUATION

How well has the teacher education program, or parts of it, functioned? What criteria have been used and what standards have been employed in making judgments about the program? What purpose has the evaluation served?

Three studies were located which used intermediate, process, or "intrinsic" criteria as the basis for evaluation. That is, the criteria were a set of program conditions which were assumed to be desirable -- to lead ultimately to a superior educational product. Furthermore, all three studies were designed primarily to provide feedback for the improvement of specific phases of the program -- "formative" evaluation. In the first study, a jury of head teacher trainers in agriculture was used to develop an instrument for evaluating agricultural teacher education programs in fifteen land grant institutions with predominantly Negro enrollments (Bronson, 1963). Self-ratings in the fifteen institutions then revealed that research, recruiting, and public relations were considered the weakest program areas, while staff, curriculum and facilities were judged to be program strengths. The second intrinsic, formative study had twenty-nine distributive teacher educators rate parts of their programs (Knouse, 1962). It was agreed that several portions of the program, e.g. student teaching in coordination and adult education, needed strengthening. The third investigator (Swanson, 1964) had judges develop a list of "good" practices in industrial education master's degree programs. He then secured an 87 percent response from all departments with those programs, consisting of ratings of their own comparable practices. Respondents felt that they were doing a good job in professional education, but research and technical training were not considered as satisfactory, and the general education provided was believed to be least satisfactory. Incidentally, it was also recognized that too little emphasis was placed upon faculty research activity.

"Pay-off" evaluation research utilizes educational outcomes as criteria. Rather than employ variables intrinsic to the program, pay-off criteria are the products, e.g. student success, community impact, of the process. Five

investigators conducted pay-off, formative evaluations. Sixty-six beginning vocational agriculture teachers, their administrators and their supervisors, rated the teachers' actual and the desired competencies (Gadda, 1963). The greatest congruence between actual and desired competencies was related to FFA activities; the least congruence was in the areas of guidance, teaching, and supervising farm programs. The three groups of raters also differed significantly in their ratings of at least 10 percent of the desired competencies. Two researchers had business education teachers evaluate their undergraduate teacher education programs. In one case (Green, 1964), the majority of respondents felt that (a) they were well prepared in business administration and office administration, but not in economic theory, (b) psychology and English were the most important general education subjects, but public speaking was the most useful, and (c) shorthand, typing, accounting and typewriting were the most important business subjects. In the other study (Bonner, 1964), the responding teachers identified seventeen categories of teaching problems and attributed these to inadequate exposure or to ineffective learning experiences with relevant content provided during their undergraduate program. The final two investigators conducting pay-off, formative evaluations obtained trade and industrial teachers' ratings of teacher education programs. One investigator presented the teachers with 175 items of instruction drawn from eight required courses; the teachers rated each item on its relevancy to their teaching duties and on adequacy of instruction (Brantner, 1962). The teachers believed that a majority of the items were relevant to their instructional duties, and that the same items had also been adequately taught. The other researcher (Ryan, 1963) had 174 beginning trade and industrial education teachers indicate on a check list the problems they had encountered. Eighty percent of the teachers acknowledged receiving some help from the training program on some of the listed problems, but more than 30 percent felt they received no help on eleven of the problem items listed. In addition to the subjectivity of teacher ratings in these kinds of studies, the respondents are a probable mixture of good and poor students, and good and bad teachers. Whose opinion counts?

Besides formative assessments, done principally to provide help in developing and revising programs, intrinsic and pay-off evaluations may also be "summative". That is, they presume to make an overall judgment about the program's effectiveness. Nine such pay-off, summative studies were located.

Principals and state supervisors rated the effectiveness of a sample of agricultural education teachers (Cardozier, 1965). Only a small relationship was found between effectiveness and overall achievement in undergraduate courses, but a positive, significant correlation was shown to exist between rated teaching effectiveness and grades in speech and grades in student teaching. The morale of about three hundred vocational agriculture teachers was measured by a specially devised instrument (Bentley and Rempel, 1963). Salary and tenure status were found positively related to morale. It was not unexpected, therefore, that those teachers with more than a Bachelor's degree and more than nine years of teaching also had higher morale than those with less education and experience. A small sample of agricultural teachers was designated by state supervisors as most and least effective (McComas, 1962).

The most effective teachers differed from their least effective colleagues in the following ways: (a) They were more satisfied, (b) they were more active in the community, (c) they taught more courses for young and adult farmers, (c) they had earned more hours beyond their highest degree, (d) they taught in slightly larger schools, and (e) they were in greater agreement with administrators regarding their roles.

A critical incident study reported in an earlier section of this review (Samson, 1964) found that distributive teacher-coordinators who were observed to have the greatest proportion of favorable teaching behaviors were younger and had lower salaries, less education, less teaching experience, but more experience in distributive occupations than the other teachers observed. This finding, of course, could reflect recently improved teacher selection practices and/or teacher education programs, or just changing values in what constitutes effective teaching behavior. Six distributive education teachers with the most preparation in economics and six with the least preparation from a statewide population were compared by testing the level of economic understanding of their students (Meisner, 1966). No significant differences were found, but other relevant variables were not controlled.

By means of a pre-post-test measure, one researcher showed that the student teaching experience of a sample of home economics students improved their average attitude toward education and teaching in the secondary school (Anderson, 1964). The people contacted, and the effort needed for teaching were among the factors influencing the attitude change.

Technical education teachers rated by directors as highly successful usually attended state universities, while low success teachers attended other four-year institutions (Storm, 1966). High success teachers also had more advanced degrees, but less teaching and industrial experience, than low success instructors. Another study employed a questionnaire to determine the adjustment experiences of newly assigned industrial education teachers (Baranyai, 1965). Greater teacher satisfaction and fewer problems were associated with men who (a) were older, (b) had more education, (c) taught in the lower grades, (d) had more student teaching experience, and (e) possessed higher vocational certification. Finally, an attempt was made (Ehrenborg, 1963) to develop a descriptive rating scale to measure the success of industrial arts teachers. The instrument, consisting of items relating to the instructional and management programs of the teacher and to his behavior, was reported to have satisfactory reliability and validity based upon preliminary trials.

At the risk of drawing premature conclusions, the sparse data on program evaluation (plus that reported in the section on Guidance and Selection) could be interpreted by teacher educators to mean that (a) vocational-technical teacher education programs do seem to have a beneficial effect upon teacher behavior, (b) programs and/or selection techniques appear to be slowly improving, (c) student teaching is an important aspect of teacher education, and (d) there is certainly abundant room for increasing program efficiency and effectiveness. From a research viewpoint, the available information is less satisfying. Procedures need improvement; greater use should be made of comparison groups, and techniques must be developed that

will permit better approximations of causal relationships. The most critical kinds of program evaluation questions at this time, however, probably have to do with the selection and measurement of valid criterion variables. We need to develop internally consistent intrinsic (related to program) criteria which, in our best judgment, will effectively lead to the development of those teacher competencies which we hold to be required in light of our perception of desirable teacher role and behaviors. We need to develop means for accurately measuring the degree to which those intrinsic criterion variables exist within operating teacher education programs. We must learn to measure the extent to which identified intrinsic criterion variables actually effect teacher behavior patterns. And we need to establish the relationships between teacher behavior and actual student outcomes in varying situations. These kinds of studies will provide bases for evaluating the "success" of programs on a qualitative dimension. There are, however, other evaluative dimensions that should also be investigated. Teacher satisfaction, institutional expense versus increments in teacher effectiveness added by the program, and the ability of programs to produce adequate numbers of satisfactory instructors are among them.

SUMMARY

In addition to editorial comments liberally scattered throughout the review, it seems appropriate to conclude with some general prescriptive statements.

With some exceptions of course, little has been done which materially contributes to the development of a science of teacher education. We need a system of verified principles which will permit us to understand and control the teacher education process. At present we are still operating programs primarily on the basis of tradition, "convention" wisdom, and personal experience. This does not imply that current teacher education practices are necessarily bad, only that we really don't know their worth, and that we cannot be reasonably confident about judging suggested means for improving present practices. An understandable caution in making changes based on current knowledge is reflected in one study (Allen, 1966a) which asked fifty trade and technical "leaders" from thirty-eight states to indicate the extent of innovations in their teacher education programs since 1961; "slight to moderate" change was the mode. The fact that the same study showed widely differing program requirements indicates the importance of tradition and personal experience in determining program.

Most, if not all, of the categories utilized in this review do not represent problem areas unique to vocational-technical teacher education either in this country, to teacher education in general, or to education as a whole. Reports from European countries (International Vocational Training Information and Research Centre, 1964) reveal that they have concerns very similar to ours. Certainly, speculation about the desirable roles of future teachers and their behavioral patterns, the identification of relevant competencies, questions of supply and demand, problems of choosing and organizing content for programs, assessing student characteristics which affect success and satisfaction, and evaluating programs involve many elements which are common to all teacher

education and to most other educational programs. The categories should therefore be recognized as an interpretation of persistent educational problems as seen from one special perspective.

Important problems are usually complex and become persistent because we lack the tools - the research techniques and instruments - necessary to solve them. The development of appropriate research methodology appears essential to progress in resolving many of the substantive questions represented by the major problem areas (categories) in this review. The attainment of satisfactory answers to our practical, but complex and persistent, vocational-technical teacher education questions is therefore viewed as being dependent upon long-term programmatic research efforts, facilitated by the adoption of some research paradigm[4], such as the one suggested in this review.

The University of Texas has recently established a Research and Development Center in Teacher Education. We should follow its progress closely so as to utilize relevant results, but we should also undertake additional systematic efforts of our own. The task before us is too important and too large to depend entirely upon the efforts of others, or upon sporadic, uncoordinated activities on our part.

[4]The chapter by N. Gage in Handbook for Research on Teaching, 1963, contains a discussion of models for research on teaching.

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